REMARKS/ARGUMENTS

Claims 1-10 are canceled. Claims 11-20 are pending. Claims 17, 18, 19, and 20 have been amended in formal respects only, as suggested by the Examiner.

Summary of Final Office Action

Claim 15 was indicated to be drawn to patentable subject matter.

Claims 11-14 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/44527 A1 to Perrin et al. in view of U.S. Patent No. 4,378,194 to Bandukwalla.

Claims 17-18 and 20 were rejected under 35 U.S.C. 103(a) as being unpatentable over DE 19835594 A1 to Ganz, Perrin et al., and further in view of Bandukwalla.

Claim 19 was rejected under 35 U.S.C. 103(a) as being unpatentable over Perrin et al. in view of Bandukwalla, and further in view of U.S. Patent No. 6,804,952 to Sasaki et al.

Summary of Interview

The Examiner is thanked for her courtesy in conducting a telephone interview with Applicant's undersigned representative on March 24, 2009. In the interview, the undersigned discussed the Perrin and Bandukwalla references as they have been applied in the rejections. It was argued that Bandukwalla is a compressor reference and thus does not have particular relevance to Perrin's variable turbine nozzle. At any rate, even if Bandukwalla were deemed to be pertinent, the undersigned argued that it fails to disclose a stepped piston that has an annular first portion that passes along the radial inside or outside of vanes and contacts the inboard wall in a fully closed position of the piston. Rather, Bandukwalla would not want to completely close the compressor diffuser and therefore fails to teach this important aspect of the present claims.

In reply, the Examiner indicated that she knows of another reference, U.S. Patent No. 2,996,996 to Jassniker, which she said does teach completely closing a compressor diffuser. The

Examiner pointed to col. 1, lines 60-62, as teaching that cover members (8 and 9) "can be pressed together in coaxial position". The undersigned responded that it appears that passage of Jassniker is describing the manufacturing process for making the cover members, and is not describing that the cover members are pressed together during operation of the turbomachine.

Thus, in the interview, the undersigned argued that Bandukwalla (and Jassniker) fails to teach or suggest providing, in a variable turbine nozzle, a stepped piston that has an annular first portion that passes along the radial inside or outside of vanes and *contacts the inboard wall in a fully closed position of the piston.*

Response to Rejections

With respect to independent Claim 11, the Office Action indicated that Perrin discloses a turbocharger having a variable nozzle device, but fails to disclose the shape of the piston end having a first portion passing along the radial inside of the vanes. However, the Office Action indicated that Bandukwalla teaches it is conventional in the art of centrifugal compressors to utilize a piston end (54) that is stepped such that an annular first portion of the piston end extends axially farther toward the inboard wall (22) than does a second portion of the piston end. The Office Action further asserted that Bandukwalla teaches the piston being axially movable into a fully closed position in which the first portion of the piston end contacts the inboard wall (22) to as to completely close the annular nozzle (sic, diffuser). The Office Action asserted that it would have been obvious to use the piston shape of Bandukwalla in Perrin's variable nozzle in order to improve the efficiency, since the use thereof would have optimized over a wide range of flow rates through the diffuser/nozzle, or alternatively because its use would have yielded predictable results.

Applicant respectfully submits that a person of ordinary skill in the art concerned with variable turbine nozzles such as Perrin's nozzle would not have considered Bandukwalla's compressor teachings as being of particular relevance to turbine nozzles. However, even if Bandukwalla were considered to be of some relevance, Bandukwalls still fails to teach or suggest a stepped piston that is movable into a fully closed position such that an annular first portion of

the piston end passes along the radial inside or outside of the vanes and contacts the inboard wall of the nozzle. Indeed, Bandukwalla clearly teaches that the diffuser of his compressor is to *remain open during operation*:

> "Static pressure in diffuser passage 53 will be a function of the compressor output and will tend to move throttle ring 54 to the left as viewed in FIG. 1 so as to increase the area of diffuser passage 53. The dynamic pressure of the issuing fluid will also result in a leftward force being exerted on throttle ring 54 and this force is opposed by spring 56, or the like, which is located in chamber 57. Additionally, by connecting line 58 to a vacuum (not illustrated), such as the evaporator of the refrigeration system, an additional load related opening force will be exerted against the force of the spring 56. Thus, static pressure, dynamic pressure and evaporator pressure are all used to provide an opening force to widen diffuser passage 53 in opposition to the force of spring 56." (Col. 3, lines 50-64.)

Thus, only the spring 56 would potentially be capable of causing the throttle ring 54 to contact the opposite wall 22 of the diffuser passage—but nowhere in Bandukwalla is there the slightest suggestion that the spring 56 is actually capable of causing such a complete closing of the diffuser. Furthermore, there is no apparent reason why one would ever want to completely close the diffuser.

Accordingly, based on Bandukwalla, a person of ordinary skill in the art would learn no more than that a throttle ring 54 can have a portion passing along the radial inside of diffuser vanes. Nothing in Bandukwalla would have suggested the further limitations in Claim 11, namely, that a stepped piston is movable into a fully closed position such that an annular first portion of the piston end passes along the radial inside or outside of the vanes and *contacts the inboard wall of the nozzle.*

For at least these reasons, even if Perrin and Bandukwalla were combined as asserted in the Office Action, they still would fail to teach or suggest the invention of Claim 11. Therefore, Claim 11 (and all claims dependent thereon or having the same limitations—i.e., Claims 12-20) are patentable over the cited references.

Applicant would also like to address the Jassniker reference that the Examiner mentioned in the interview, although currently it has not be applied in any rejection. Jassniker describes a turbomachine having a variable diffuser 3. It is made variable by an axially movable annular portion 5' of one wall 5 of the diffuser. Vanes 10 extend across the diffuser passage, and pass through slots 12 in a cover member 9 attached to the movable portion 5'. The opposite (fixed) wall 4 of the diffuser also has a cover member 8 having slots 12 for the vanes 10 to pass through. Jassniker at col. 1, lines 57-63, describes that it is simple to make the apertures or slots in the cover members (8 and 9): "The cover members are relatively thin and can be pressed together in coaxial position whereupon the apertures or slots for the guide vanes may be made in the cover members, for example, by spark erosion."

This passage clearly is describing the process of *manufacturing* the cover members 8, 9. It does not suggest that during actual operation of the turbomachine, the cover members 8 and 9 would ever be pressed together to completely close the diffuser 3. As with Bandukwalla, there is no apparent reason why one would ever want to completely close the diffuser.

Since all of the rejections depend upon the combination of Perrin and Bandukwalla allegedly teaching the variable nozzle as claimed, and since it has been shown that the combination would not have suggested the variable nozzle as claimed, Applicant respectfully submits that all of the rejections should be withdrawn.

A further comment regarding the rejection of Claim 19 is required. The Office Action acknowledged that Perrin and Bandukwalla fail to teach a catalyst disposed downstream of the turbocharger, fail to teach that the turbine housing and the piston are configured such that the fully open position of the piston allows some of the exhaust gas flowing through the annular nozzle to bypass the turbine wheel, and fail to teach that the engine boosting system is operable to open the variable nozzle device at a start of the engine so as to cause exhaust gas to bypass the turbine wheel and heat up the catalyst. For these missing limitations, the Office Action cites

U.S. Patent No. 6,804,952 to Sasaki et al., and specifically Figures 1 and 15, and col. 13, lines 42-52.

However, while Sasaki teaches the use of a catalyst, it does not teach or suggest any of the other limitations noted in the paragraph above. As Figure 15 clearly illustrates, during the early catalyst warm-up period, the nozzle 25 of the variable nozzle turbine (VNT) is closed. Sasaki teaches that this is done so that engine back pressure will be increased, which in turn will require an increased amount of fuel to the engine, and this will help warm up the catalyst (col. 13, lines 42-52).

Thus, Sasaki teaches the opposite of what Claim 19 requires. Claim 19 requires that the engine boosting system is operable to open the variable nozzle device at a start of the engine, while Sasaki teaches closing the variable nozzle during the warm-up period. Furthermore, Claim 19 requires that exhaust gas *bypass* the turbine wheel by *fully opening* the variable nozzle, so that the exhaust gas will heat up the catalyst. This is not remotely suggested by Sasaki or the other cited references. For these additional reasons, Claim 19 is patentable over the references.

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Conclusion

Based on the above amendments and remarks, Applicant respectfully submits that the application is in condition for allowance.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required

therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

Donald M. Hill, Jr.
Registration No. 40,646

Send all correspondence regarding this application to:

Chris James
Honeywell Transportation Systems
3201 West Lomita Boulevard
Torrance, CA 90505
Tel (310) 791-7850
Fax (310) 791-7855

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON MARCH 24, 2009.